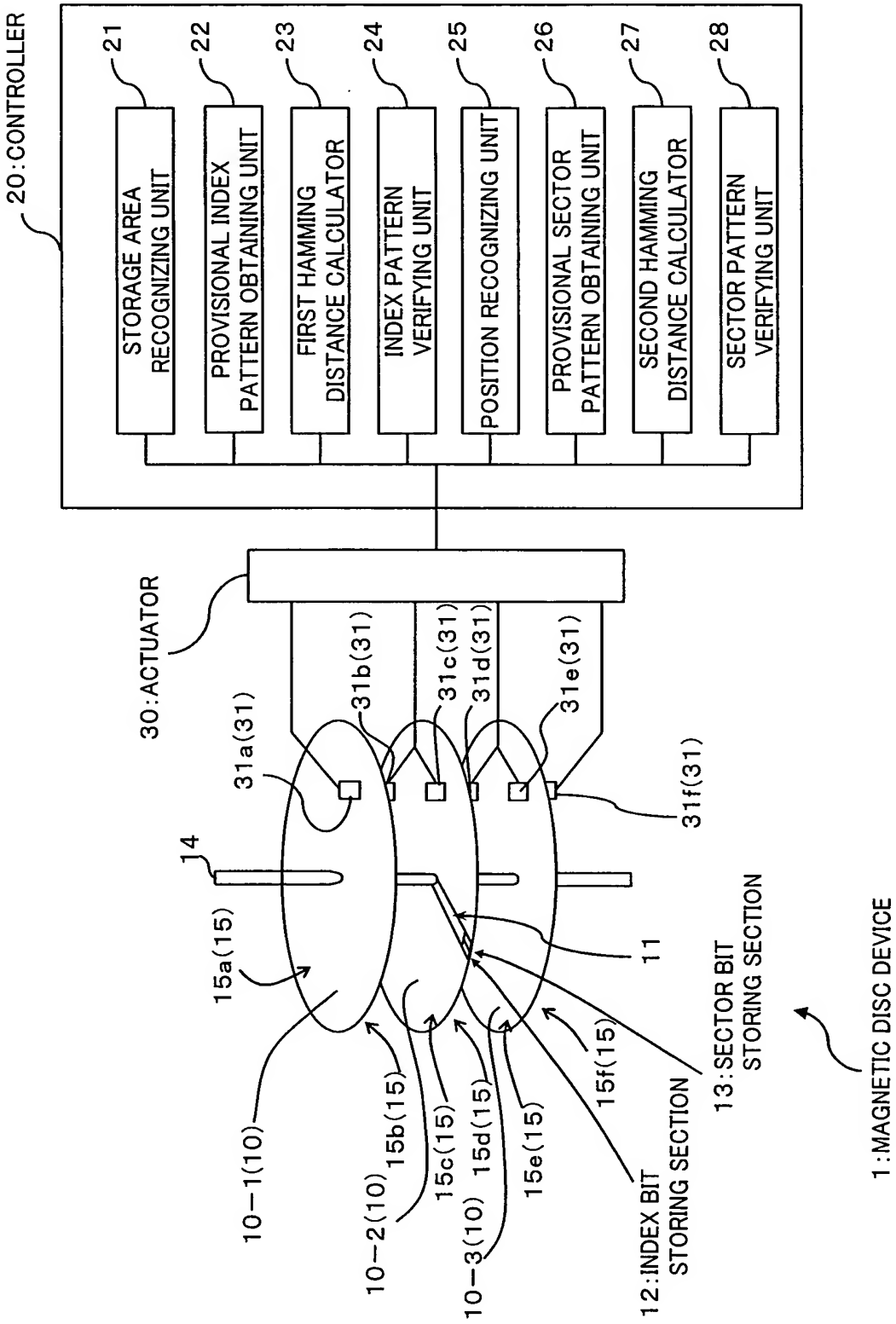
FIG. 1


20:CONTROLLER
21
STORAGE AREA RECOGNIZING UNIT
22
PROVISIONAL INDEX PATTERN OBTAINING UNIT
23
FIRST HAMMING DISTANCE CALCULATOR
24
INDEX PATTERN VERIFYING UNIT
25
POSITION RECOGNIZING UNIT
26
PROVISIONAL SECTOR PATTERN OBTAINING UNIT
27
SECOND HAMMING DISTANCE CALCULATOR
28
SECTOR PATTERN VERIFYING UNIT
30:ACTUATOR
31a(31)
31b(31)
31c(31)
31d(31)
31e(31)
31f(31)
14
15a(15)
10-1(10)
10-2(10)
15b(15)
15c(15)
10-3(10)
15d(15)
15e(15)
15f(15)
11
12:INDEX BIT STORING SECTION
13:SECTOR BIT STORING SECTION
1:MAGNETIC DISC DEVICE

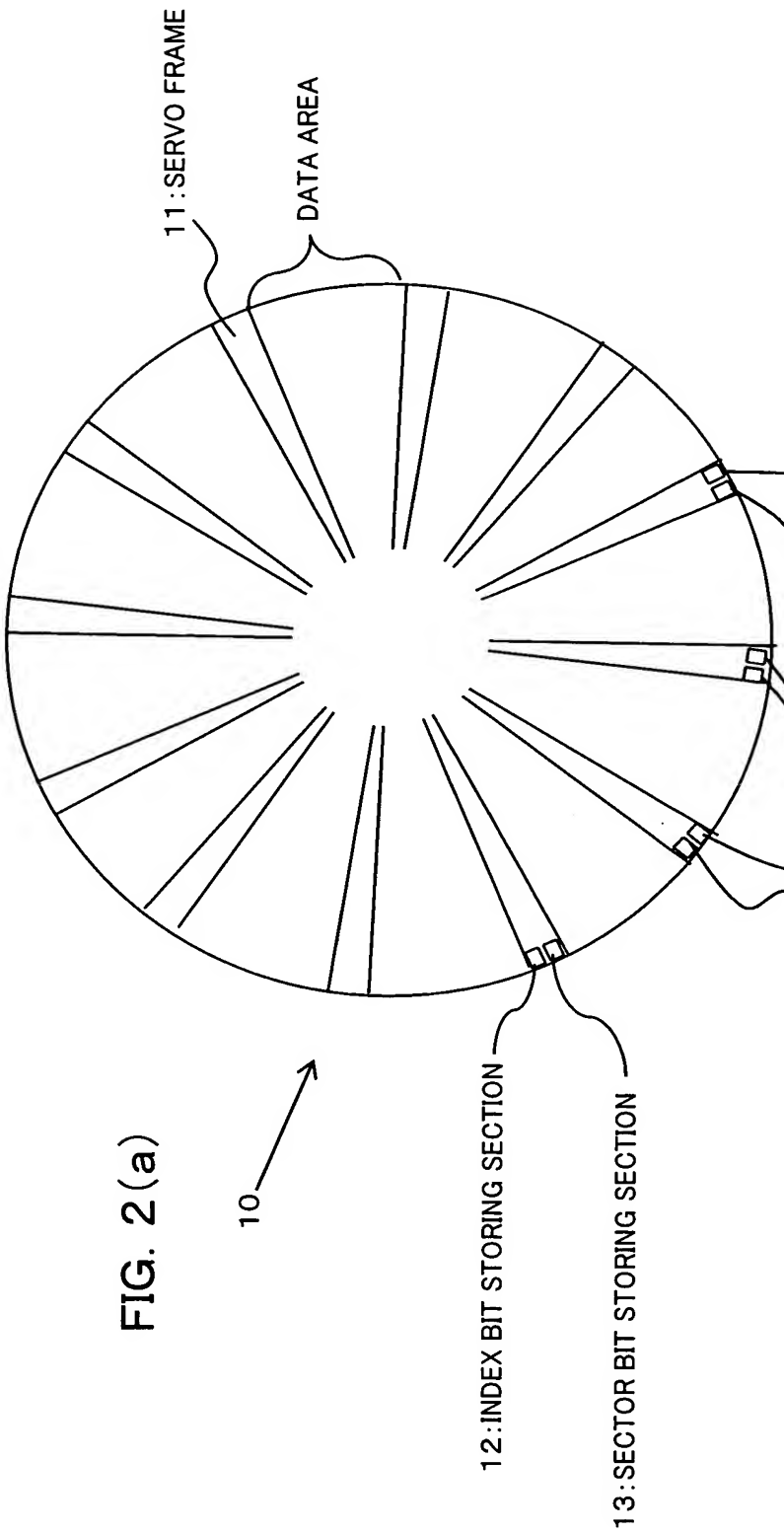


FIG. 2(a)

FIG. 2(b) INDEX BIT STRING :0

FIG. 2(c) SECTOR BIT STRING :0

FIG. 3

INDEX PATTERN NO.	INDEX PATTERN
1	0 0 0 0 0 1 0 1 1 0 1 1 1 0 0 0
2	0 0 0 0 0 1 1 1 0 0 1 1 0 1 1 0
3	0 0 0 0 0 1 1 1 0 1 0 1 1 0 0 0
4	0 0 0 0 1 0 0 1 1 1 1 0 1 0 0 0
5	0 0 0 0 1 1 0 0 1 0 1 0 1 1 1 1
6	0 0 0 1 0 1 1 0 0 1 0 0 1 1 1 0
7	0 0 0 1 1 1 1 0 0 1 0 1 0 1 0 0
8	0 0 0 1 1 1 1 1 0 0 1 1 0 1 0 1

FIG. 4

SF0	SF1	SF2	SF3	SF4	SF5	SF6	SF7	SF8	SF9	SF10	SF11	SF12	SF13	SF14	SF15
SF18	SF19	SF20	SF21	SF22	SF23	SF24	SF25	SF26	SF27	SF28	SF29	SF30	SF31	SF32	SF33
SF36	SF37	SF38	SF39	SF40	SF41	SF42	SF43	SF44	SF45	SF46	SF47	SF48	SF49	SF50	SF51
SF54	SF55	SF56	SF57	SF58	SF59	SF60	SF61	SF62	SF63	SF64	SF65	SF66	SF67	SF68	SF69
SF71	SF72	SF73	SF74	SF75	SF76	SF77	SF78	SF79	SF80	SF81	SF82	SF83	SF84	SF85	SF86
SF88	SF89	SF90	SF91	SF92	SF93	SF94	SF95	SF96	SF97	SF98	SF99	SF100	SF101	SF102	SF103
SF105	SF106	SF107	SF108	SF109	SF110	SF111	SF112	SF113	SF114	SF115	SF116	SF117	SF118	SF119	SF120
SF122	SF123	SF124	SF125	SF126	SF127	SF128	SF129	SF130	SF131	SF132	SF133	SF134	SF135	SF136	SF137
SF139	SF140	SF141	SF142	SF143	SF144	SF145	SF146	SF147	SF148	SF149	SF150	SF151	SF152	SF153	SF154
0	0	0	0	0	1	0	1	1	0	1	1	1	0	0	0

STORAGE APPARATUS...
Tatsuhiko Rosugi
Greer, Burns & Crain, Ltd.
Ref. No. 3138.69864
Sheet 4 of 14
February 25, 2004
(Patrick Burns)
(312) 360-0080

FIG. 5

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	HAMMING DISTANCE
INDEX PATTERN 1	0	0	0	0	0	1	0	1	1	0	1	1	1	0	0	0	
1-LINE SHIFT	0	0	0	0	0	0	1	0	1	1	0	1	1	1	0	0	6
2-LINE SHIFT	0	0	0	0	0	0	0	1	0	1	1	0	1	1	1	0	6
3-LINE SHIFT	0	0	0	0	0	0	0	0	1	0	1	1	0	1	1	1	6
4-LINE SHIFT	1	0	0	0	0	0	0	0	0	1	0	1	1	0	1	1	8
5-LINE SHIFT	1	1	0	0	0	0	0	0	0	0	1	0	1	1	0	1	8
6-LINE SHIFT	1	1	1	0	0	0	0	0	0	0	0	1	0	1	1	0	10
7-LINE SHIFT	0	1	1	1	0	0	0	0	0	0	0	0	1	0	1	1	10
8-LINE SHIFT	1	0	1	1	1	0	0	0	0	0	0	0	0	1	0	1	12
9-LINE SHIFT	1	1	0	1	1	1	0	0	0	0	0	0	0	0	1	0	10
10-LINE SHIFT	0	1	1	0	1	1	1	0	0	0	0	0	0	0	0	1	10
11-LINE SHIFT	1	0	1	1	0	1	1	1	0	0	0	0	0	0	0	0	8
12-LINE SHIFT	0	1	0	1	1	0	1	1	1	0	0	0	0	0	0	0	8
13-LINE SHIFT	0	0	1	0	1	1	0	1	1	1	0	0	0	0	0	0	6
14-LINE SHIFT	0	0	0	1	0	1	1	0	1	1	1	0	0	0	0	0	6
15-LINE SHIFT	0	0	0	0	1	0	1	1	0	1	1	1	0	0	0	0	6

FIG. 6

M \ N	1	2	3	4	5	6	7	8
1	6	4	4	4	4	5	5	5
2	4	6	5	4	5	4	4	4
3	4	5	6	4	4	4	5	5
4	4	5	4	6	4	4	5	5
5	4	4	4	4	6	4	4	5
6	4	4	4	4	5	6	4	4
7	4	4	4	4	4	4	6	4
8	4	4	4	4	4	4	4	6

FIG. 7

SECTOR PATTERN 1	0000111111100001
SECTOR PATTERN 2	0111111100000010
SECTOR PATTERN 3	0111000011100011
SECTOR PATTERN 4	1011110011000100
SECTOR PATTERN 5	1011001100100101
SECTOR PATTERN 6	1100001111000110
SECTOR PATTERN 7	1100110000100111
SECTOR PATTERN 8	1101101010101000
SECTOR PATTERN 9	1101010101001001
SECTOR PATTERN 10	1010010110101010
SECTOR PATTERN 11	1010101001001011
SECTOR PATTERN 12	0110011001101100
SECTOR PATTERN 13	0110100110001101
SECTOR PATTERN 14	0001100101101110
SECTOR PATTERN 15	0001011010001111
SECTOR PATTERN 16	1110100101110000
SECTOR PATTERN 17	1110011010010001
SECTOR PATTERN 18	1001011001110010
SECTOR PATTERN 19	1001100110010011
SECTOR PATTERN 20	0101010110110100
SECTOR PATTERN 21	0101101001010101
SECTOR PATTERN 22	0010101010110110
SECTOR PATTERN 23	0010010101010111
SECTOR PATTERN 24	0011001111011000
SECTOR PATTERN 25	0011110000111001
SECTOR PATTERN 26	0100110011011010
SECTOR PATTERN 27	0100001100111011
SECTOR PATTERN 28	1000111100011100
SECTOR PATTERN 29	1000000011111101
SECTOR PATTERN 30	1111000000011110
SECTOR PATTERN 31	1111111111111111
SECTOR PATTERN 32	0000000000000000

FIG. 8

SF0	SF1	SF2	SF3	SF4	SF5	SF6	SF7	SF8	SF9	SF10	SF11	SF12	SF13	SF14	SF15
0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	1
SF18	SF19	SF20	SF21	SF22	SF23	SF24	SF25	SF26	SF27	SF28	SF29	SF30	SF31	SF32	SF33
0	1	1	1	1	1	1	1	0	0	0	0	0	0	1	0
SF36	SF37	SF38	SF39	SF40	SF41	SF42	SF43	SF44	SF45	SF46	SF47	SF48	SF49	SF50	SF51
0	1	1	1	0	0	0	0	1	1	1	0	0	0	1	1
SF54	SF55	SF56	SF57	SF58	SF59	SF60	SF61	SF62	SF63	SF64	SF65	SF66	SF67	SF68	SF69
1	0	1	1	1	1	0	0	1	1	0	0	0	1	0	0
SF71	SF72	SF73	SF74	SF75	SF76	SF77	SF78	SF79	SF80	SF81	SF82	SF83	SF84	SF85	SF86
1	0	1	1	0	0	1	1	0	0	1	0	0	1	0	1
SF88	SF89	SF90	SF91	SF92	SF93	SF94	SF95	SF96	SF97	SF98	SF99	SF100	SF101	SF102	SF103
1	1	0	0	0	0	1	1	1	1	0	0	0	1	1	0
SF105	SF106	SF107	SF108	SF109	SF110	SF111	SF112	SF113	SF114	SF115	SF116	SF117	SF118	SF119	SF120
1	1	0	0	1	1	0	0	0	0	1	0	0	1	1	1
SF122	SF123	SF124	SF125	SF126	SF127	SF128	SF129	SF130	SF131	SF132	SF133	SF134	SF135	SF136	SF137
1	1	0	1	1	0	1	0	1	0	1	0	1	0	0	0
SF139	SF140	SF141	SF142	SF143	SF144	SF145	SF146	SF147	SF148	SF149	SF150	SF151	SF152	SF153	SF154
1	1	0	1	0	1	0	1	0	1	0	0	1	0	0	1

FIG. 9

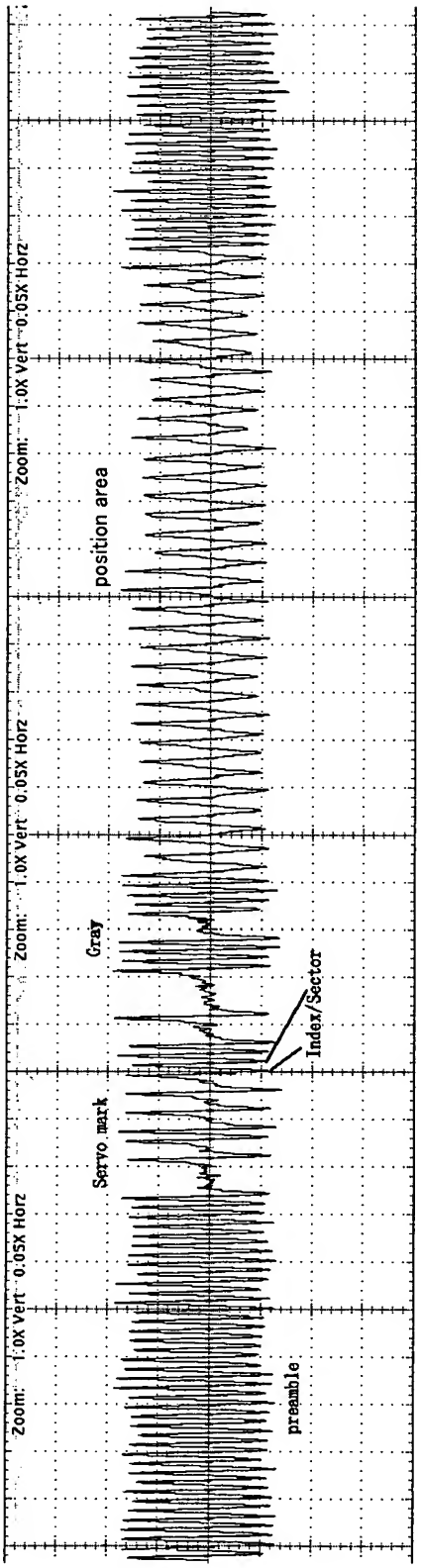

Zoom: 1.0X Vert 0.05X Horz
position area
Zoom: 1.0X Vert 0.05X Horz
Gray
Index/Sector
Zoom: 1.0X Vert 0.05X Horz
Servo mark
Zoom: 1.0X Vert 0.05X Horz
preamble

FIG. 10

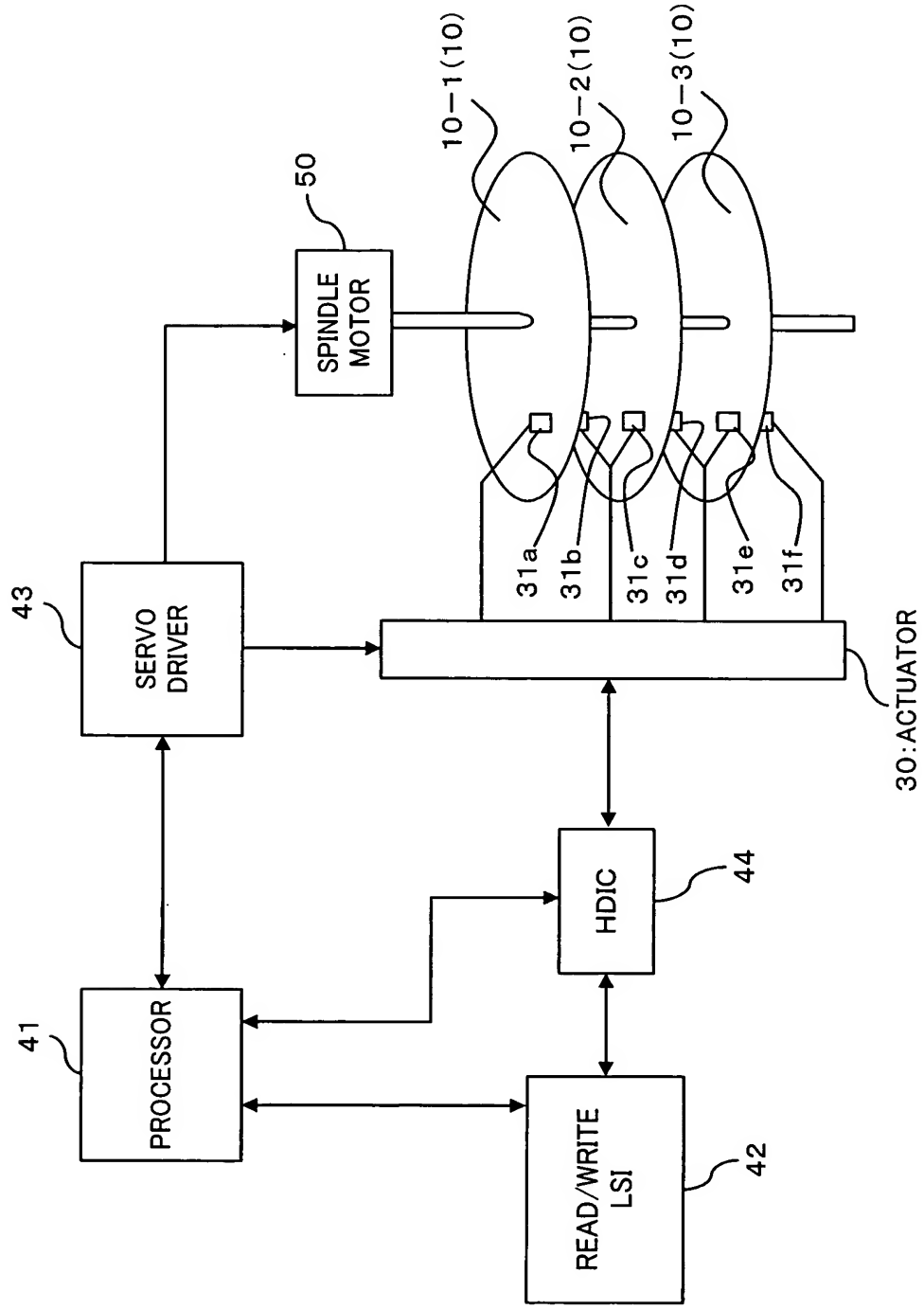

10-1(10)
10-2(10)
10-3(10)
50
SPINDLE MOTOR
31a
31b
31c
31d
31e
31f
43
SERVO DRIVER
30:ACTUATOR
HDIC
44
41
PROCESSOR
READ/WRITE LSI
42

FIG. 11

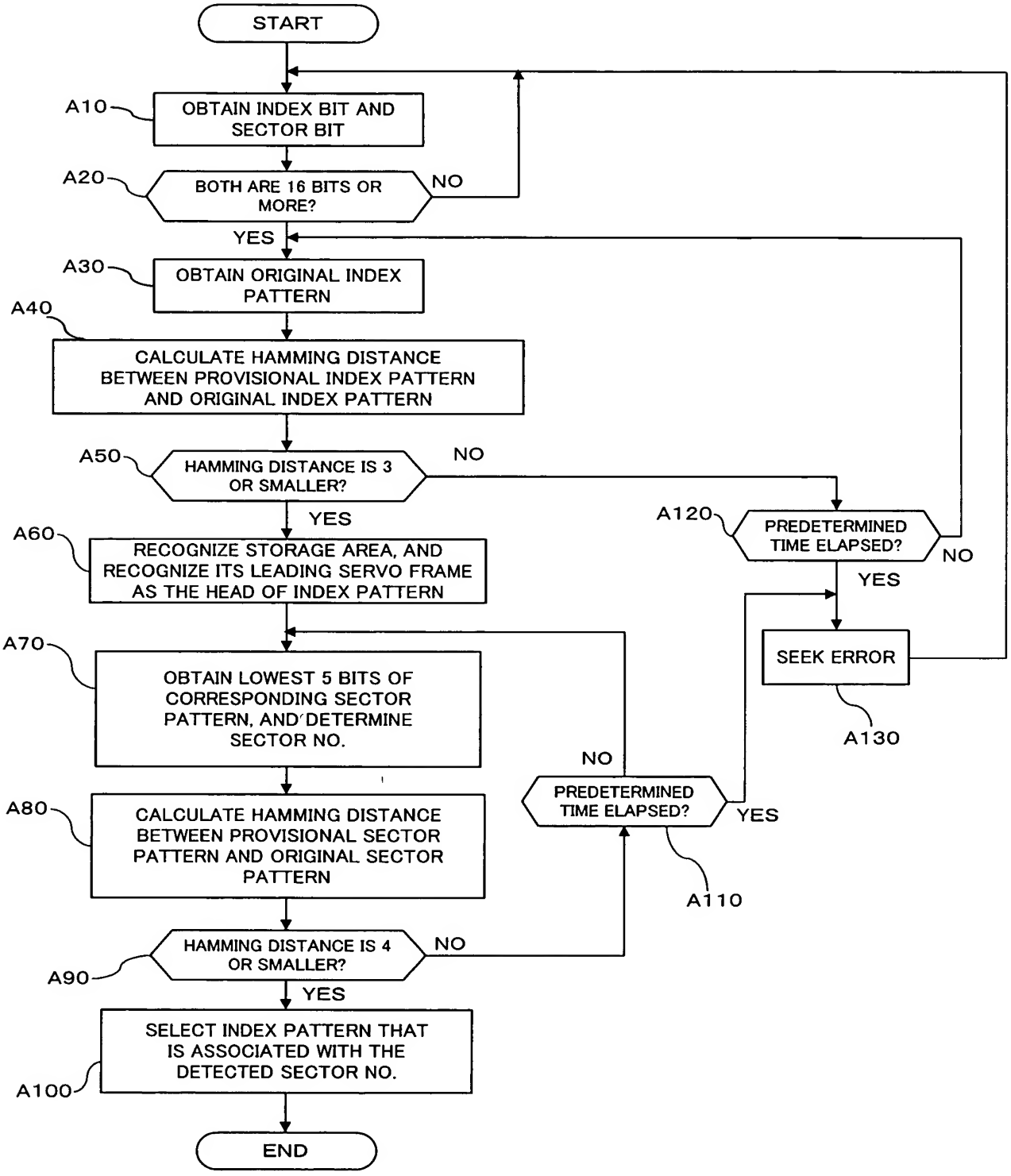

START
A10
OBTAIN INDEX BIT AND SECTOR BIT
A20
BOTH ARE 16 BITS OR MORE?
NO
YES
A30
OBTAIN ORIGINAL INDEX PATTERN
A40
CALCULATE HAMMING DISTANCE BETWEEN PROVISIONAL INDEX PATTERN AND ORIGINAL INDEX PATTERN
A50
HAMMING DISTANCE IS 3 OR SMALLER?
NO
YES
A120
PREDETERMINED TIME ELAPSED?
NO
YES
A60
RECOGNIZE STORAGE AREA, AND RECOGNIZE ITS LEADING SERVO FRAME AS THE HEAD OF INDEX PATTERN
SEEK ERROR
A130
A70
OBTAIN LOWEST 5 BITS OF CORRESPONDING SECTOR PATTERN, AND DETERMINE SECTOR NO.
NO
PREDETERMINED TIME ELAPSED?
YES
A110
A80
CALCULATE HAMMING DISTANCE BETWEEN PROVISIONAL SECTOR PATTERN AND ORIGINAL SECTOR PATTERN
HAMMING DISTANCE IS 4 OR SMALLER?
NO
A90
YES
SELECT INDEX PATTERN THAT IS ASSOCIATED WITH THE DETECTED SECTOR NO.
A100
END

FIG. 12

SECTOR PATTERN (BINARY NUMBER SYSTEM)	DECIMAL NUMBER SYSTEM
0000000000000000	0
0000000011111111	255
0000111100001111	3855
0000111111110000	4080
0011001100110011	13107
0011001111001100	13260
0011110000111100	15420
0011110011000011	15555
0101010101010101	21845
0101010110101010	21930
0101101001011010	23130
0101101010100101	23205
0110011001100110	26214
0110011010011001	26265
0110100101101001	26985
0110100110010110	27030
1001011001101001	38505
1001011010010110	38550
1001100101100110	39270
1001100110011001	39321
1010010101011010	42330
1010010110100101	42405
1010101001010101	43605
1010101010101010	43690
1100001100111100	49980
1100001111000011	50115
1100110000110011	52275
1100110011001100	52428
1111000000001111	61455
1111000011110000	61680
1111111100000000	65280
1111111111111111	65535

FIG. 13
PRIOR ART

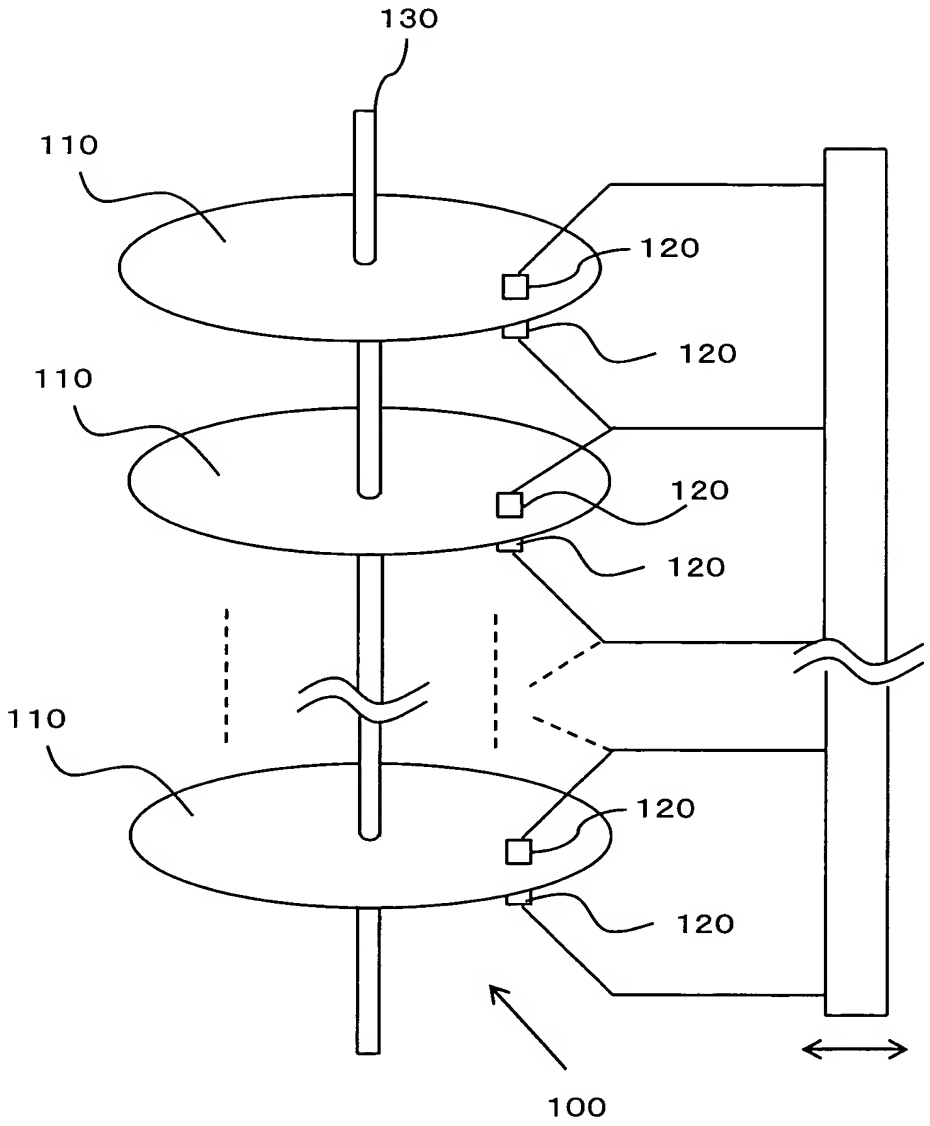
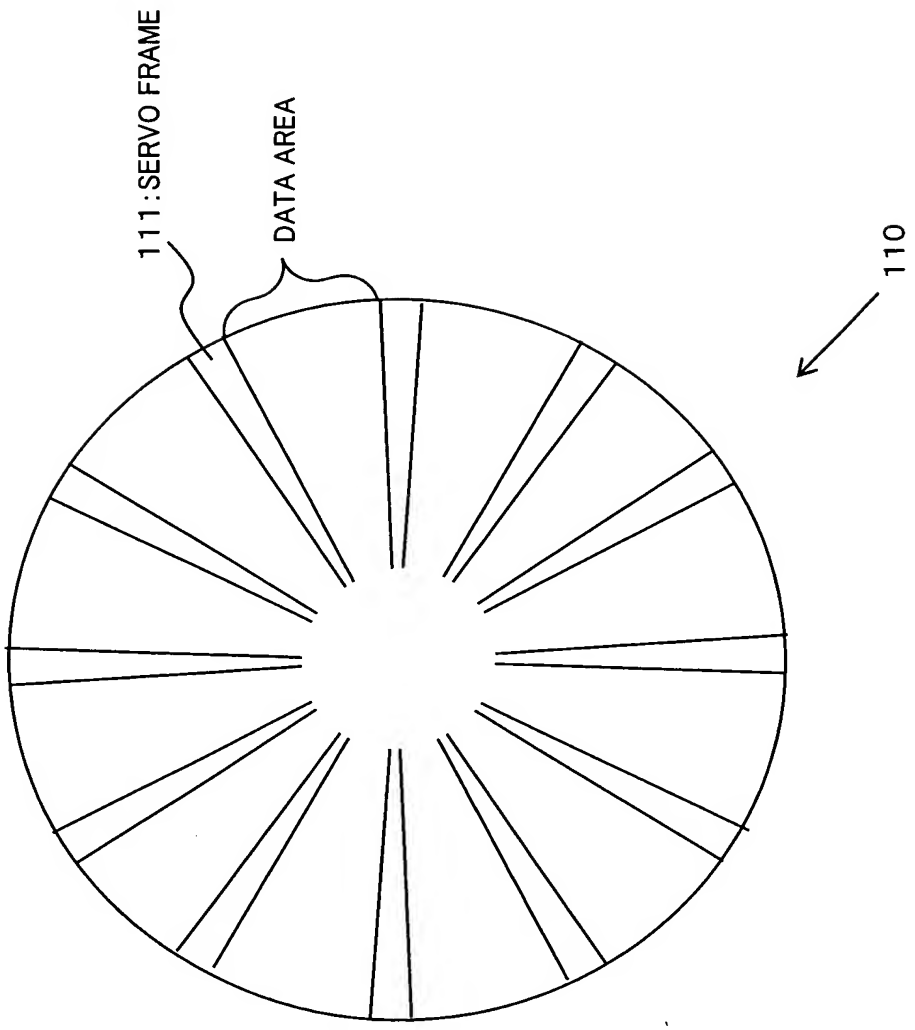



FIG. 14
PRIOR ART